# Visual Analysis Report

## **Proposed Telecommunications Facility**

# Site A - 160' Monopole: Rabbit Hill Road Warren, CT 06777

# Site B - 150' Monopole: Rabbit Hill Road Warren, CT 06777

## February 2009 - Revision 1

#### **Prepared for:**

Optasite Towers, LLC 1 Research Drive, Suite 200C Westborough, MA 01581

#### Prepared by:

Clough Harbour & Associates LLP 2139 Silas Deane Highway, Suite 212 Rocky Hill, CT 06067 CHA Project 15363-1028-1601 15363-1040-1601

#### **INTRODUCTION:**

Clough Harbour & Associates LLP (CHA) conducted a visibility study for the proposed 160'-0" monopole located at Site A and proposed 150'-0" monopole located at Site B in Warren, CT. The purpose of the study was to determine the visual impact, if any, that a proposed monopole would have on the surrounding community within a two mile radius study area of both Site A and Site B. Another purpose of the study was to compare the visual impact for both Site A and Site B to determine which location will have a more substantial impact on the surrounding community. Two techniques were utilized to determine the visual impact within the study area for both Site A and Site B: a computer model using topography and vegetation as constraints to estimate the visual limits and a field analysis to verify the visual limits determined from the computer model. The results of this analysis were then compared for the two sites. Research of the study area was also conducted to determine locations of sensitive visual receptors for both Site A and Site B.

### SITE & STUDY AREA DESCRIPTION:

The subject parcel for Site A is approximately 106.0 acres. A majority of the parcel is open farm land with a wooded area on the Southeast portion of the property. The proposed facility is located within the wooded area on the South corner of the property. The proposed facility is located approximately 1161' southeast of the existing residence. The base of the tower will be 1093' AMSL. The wooded area surrounding the proposed facility will act as a visual buffer to the adjacent residential and wooded parcels.

The subject parcel for Site B is the same as for Site A, approximately 106.0 acres. A majority of the parcel is open farm land with a wooded area on the Southeast portion of the property. The proposed facility is located to the southeast of the farm building within the open field area, adjacent to the wooded area on the South corner of the property. The proposed facility is located approximately 446' southeast of the existing residence. The base of the tower will be 1154' AMSL. There are small trees near the proposed facility that will provide a minimal visual buffer.

For both Site A and Site B, the topography within the study area consists of hills ranging from 700' AMSL to 1200' AMSL. Approximately 5,700 acres, or 71%, of the 8,053 acre study area is covered with vegetation. The rolling hills and heavy vegetation in the study area will help screen the facility in the surrounding study area. Watercourses occupy approximately 282 acres, or 3.5%, of the study area. There are no historical sites, four parks/recreational areas, one school, and no cemeteries or churches within the study area. There are designated scenic roads along Route 45/SR 478, Whittlesey Road, Rabbit Hill Road, Couch Road and Route 202 within the study area.

### **COMPUTER MODEL VISUAL ANALYSIS:**

A computer model was developed using a proprietary AutoCAD-based application developed by our Technology Solutions Group to estimate how the surrounding topography and vegetation within a 2 mile radius may obstruct the monopole's visibility. The visibility calculations are completed using digital

elevation models (DEM), which is a model of the earth's surface represented by a grid of elevations spaced 10 or 30 meters and is based on USGS topography maps. Each point in the DEM is independently tested for visibility based on the surrounding topography developed form the USGS maps. Once all points have been tested, a map is generated showing areas of visibility and areas screened by topography. Knowing which areas are screened by topography will assist in field determining which areas within the study area may have seasonal visibility. Next, vegetation within the study area is added to the map by digitizing it from 2004 aerial photographs. CHA's application utilizes a vegetation outline layer which is assigned the standard 65' height. A new map is generated showing only areas of visibility based on topography and the vegetation constraint. The visible areas on the map based on the surrounding topography and vegetation will be verified during the field visual analysis.

#### VISUAL RECEPTOR RESEARCH:

Research of the surrounding study area was conducted to determine the locations of sensitive visual receptors such as historic sites, historic districts, schools, churches, cemeteries, parks, playgrounds, recreational areas, beaches, and scenic roads. Historic sites and districts were determined from national and state registers. Surrounding schools, churches, cemeteries, parks, playgrounds, recreational areas, and beaches were determined from street maps and town GIS data. Scenic roads were determined from the CTDOT list of designated scenic roads. All of the above sensitive visual receptors were added to the viewshed map.

#### FIELD VISUAL ANALYSIS:

On November 20, 2008 a field visual analysis was conducted to verify the sensitive visual receptors and the limit of visibility determined from our research and computer model. Weather conditions were favorable on the date of the visibility study as it was a clear and sunny day with winds between 5 and 18 MPH; therefore, visibility of the balloon from surrounding areas was not affected. In general, the field visibility study was conducted as follows: one 5' diameter red balloon was flown at a height of 160'-0" above existing grade. Due to the thick vegetation in the area of the proposed tower, the balloon was flown 155' to the West in the open field adjacent to the Site A proposed location. Field data was adjusted in the office accordingly. One 5' diameter purple balloon was flown at a height of 160'-0" above existing grade at the Site B proposed location. (The tower height for Site B was subsequently reduced to 150' and the photosims and viewshed map were adjusted in the office accordingly). Once the balloons were flown, CHA completed a field drive of the surrounding area to determine the visibility of the balloons, and thus the proposed tower. Visibility from the sensitive visual receptors was our primary focus so photos were taken from each of these locations. Photos were also taken from major streets, intersections, and residential areas; from key areas where the balloon was visible; and from key areas where it was not visible. The limits of visibility determined from the computer model were field verified and adjusted as needed. Areas of potential seasonal visibility were field determined and marked on the viewshed map. All hiking trails were walked and checked for visibility. Finally, the number of residences within the seasonal and year round visible areas was determined.

### **CONCLUSION:**

The results of our visual study are summarized in the following attachments: Attachment A: Site A Viewshed Map, Attachment B: Site A Photosims, Attachment C: Site B Viewshed Map, and Attachment D: Site B Photosims. The results are also summarized in a comparative format in the charts below:

	ISIBILITY	COMPA	RISON C	HART			
ITEM	SIT	EA	SITE B		LEAST VISUAL IMPACT		
1. RESIDENCE COUNT	·						
YEAR ROUND VISIBILITY							
Rabbit Hill Road	1		2		Site A		
Jack Corner Road	2		2		Neither		
Route 202	2		1		Site B		
SEASONAL VISIBILITY							
Rabbit Hill Road	1		< <b>1</b>		Neither		
Jack Corner Road	0		0		Neither		
Route 202	9		9		Neither		
Whittlesey Road	1			1	Neither		
2. NON-VISIBLE AREAS	Acres	%	Acres	%			
Screened by Topography	4435	55.1%	4692	58.3%	Site B		
Screened by Vegetation	3482	43.2%	3236	40.1%	Site A		
3. VISIBLE AREAS	Acres	%	Acres	%			
Year Round Visibility	121	1.5%	79	1.0%	Site B		
Seasonal Visibility	15	0.2%	46	0.6%	Site A		
4. VISUAL RECEPTORS							
			0		N/A		
Historic Sites			0		Site B		
Parks/Recreational Areas Schools			0				

VIEWPOINT COMPARISON CHART							
VIEWPOINT		SITE A	SITE B				
VIEWPOINT	VISIBLE	ISIBLE DESCRIBE		DESCRIBE			
1	No	N/A	Yes	Upper 90' Year Round			
2	No	N/A	Yes	Upper 90' Year Round			
3	No	N/A	Yes	Upper 100' Year Round			
		Upper 10' thru trees Year Round					
4	Yes	Mid 30' Seasonally	Yes	Upper 90' Year Round			
5	Yes	Upper 20' Year Round	Yes	Upper 90' Year Round			
6	Yes	Upper 30' Year Round	Yes	Upper 40' Year Round			
7	Yes	Upper 20' Year Round	No	Partial Upper 10' Seasonally			
8	No	N/A	No	N/A			
9	No	N/A	No	N/A			
10	No	N/A	Yes	Upper 90' Seasonally			
11	No	N/A	No	N/A			
12	No	N/A	No	N/A			
13	No	N/A	No	N/A			
14	No	N/A	No	N/A			
15	Yes	Upper 50' Seasonally	Yes	Upper 20' Seasonally			
16	Yes	Upper 10' Year Round	Yes	Upper 110' Year Round			
17	No	N/A	Yes	Upper 80' Year Round			
18	Yes	Upper 40' Year Round	Yes	Upper 90' Year Round			
19	Yes	Upper 60' Year Round	Yes	Upper 130' Year Round			
20	No	N/A	Yes	Upper 50' Year Round			
21	No	N/A	No	N/A			
22	No	N/A	No	N/A			
23	No	N/A	No	N/A			
24	No	N/A	No	N/A			
25	No	N/A	No	N/A			
26	No	N/A	No	N/A			
27	No	N/A	No	N/A			

Most of the impact for both sites occurs within the surrounding residential neighborhoods. For year round residential impact, Site A will impact one less home on Rabbit Hill Road. The same amount of residences will be impacted on Jack Corner Road. Site B will impact one less residence on Route 202. For seasonal visual impact, the same amount of residences will be impacted on Route 202, Rabbit Hill Road, Jack Corner Road and Whittlesley Road. The differences in residences impacted by either site are minimal and neither site is preferable to the other based on residential impact.

Both sites also have similar acreages screened by topography and vegetation: Site B has slightly more acreage screened by topography and Site A has slightly more acreage screened by vegetation. The differences in areas screened by vegetation or topography are minimal and neither site is highly preferable to the other based on areas screened by vegetation and topography.

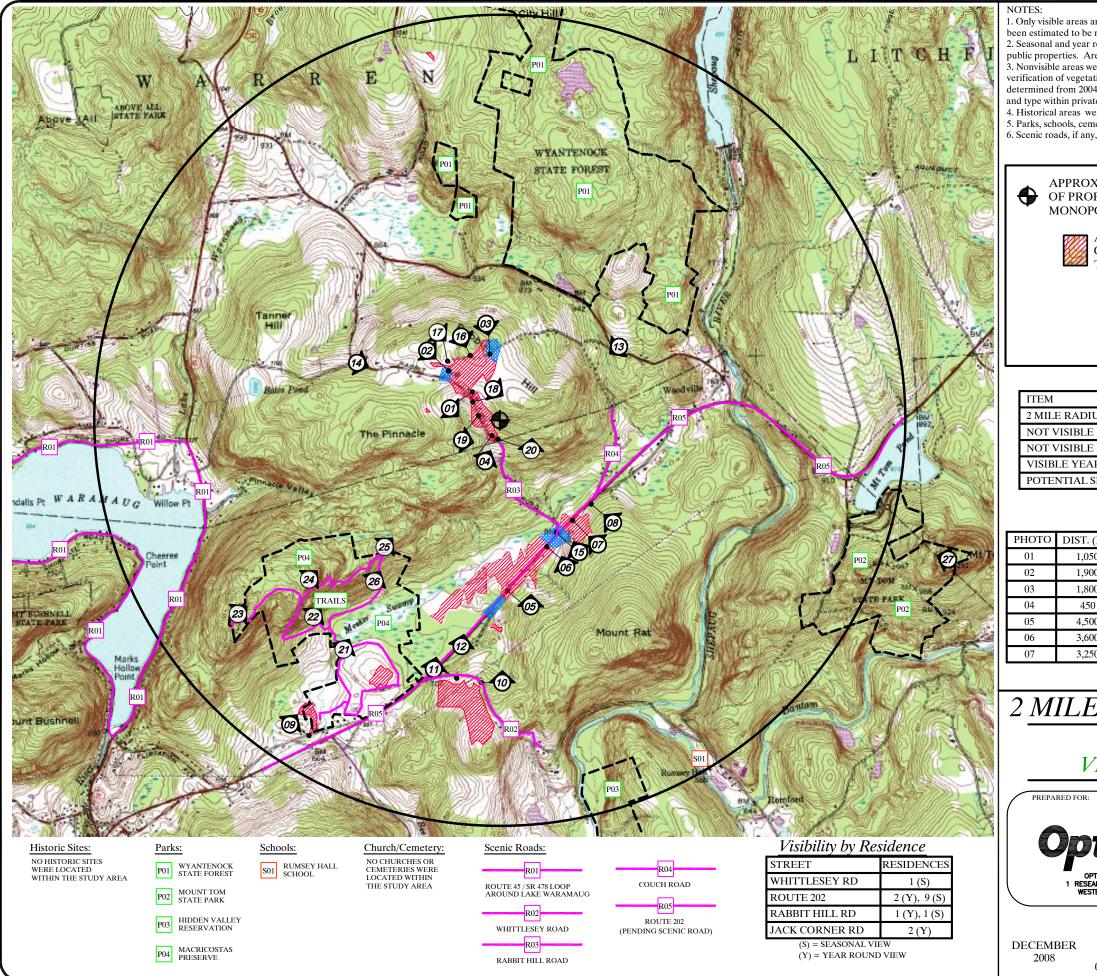
Both sites also have similar acreages with year round and seasonal visibility: Site B has slightly less acreage with year round visibility and Site A has slightly less acreage with seasonal visibility. The differences in year round and seasonal visible areas are minimal and neither site is highly preferable to the other based on seasonal and year round areas of visibility.

While both sites have viewpoints where they are visible, both year round as well as seasonally, there is a major difference between viewpoint visibility. Site B is visible from 14 of the 27 viewpoints, with 3 being visible only seasonally. Site A is visible from 8 of the 27 viewpoints, with 1 being visible only seasonally and another with increased visibility seasonally. Additionally, for those viewpoints that are visible year round, a greater portion of the Site B tower shows than those for Site A. Site A is preferable to the other based on viewpoint visibility.

Neither site is visible from historic sites, schools, churches or cemeteries. Site A is visible from a small portion of the Macricostas Preserve and from 3 scenic roads. Site B is visible from 3 scenic roads. There is no major advantage between the two sites when considering impact on surrounding visual receptors.

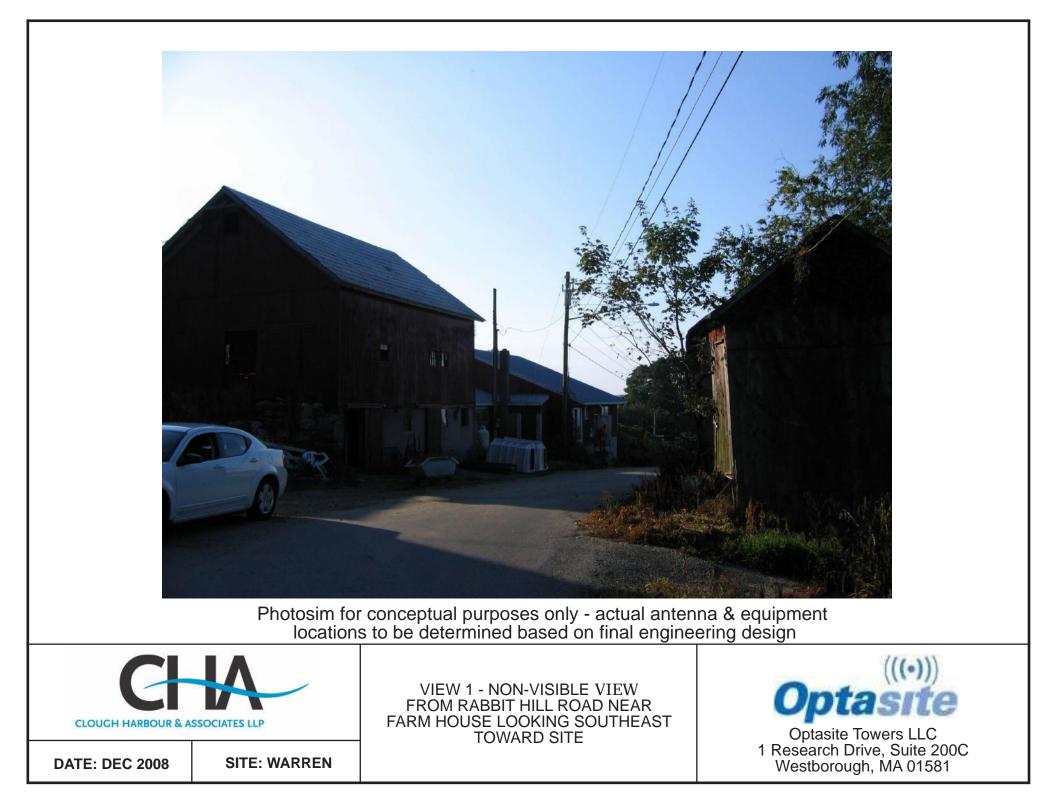
Based on the data in the Visibility Comparison Chart, the overall visibility is very similar for each site; however, the Viewpoint Comparison Chart illustrates one major difference between the two, as noted above. This is due to the physical location of the two proposed tower locations. Site B is in an open field with small trees nearby, while Site A is located within a wooded area. These surrounding trees offer a greater visual buffer to Site A, minimizing the times it can be seen, as well as the portion of the tower that can be seen at those times. Based on this one major difference, we are concluding Site A offers the least visual impact to the surrounding community that would make it the preferred choice based on visibility.

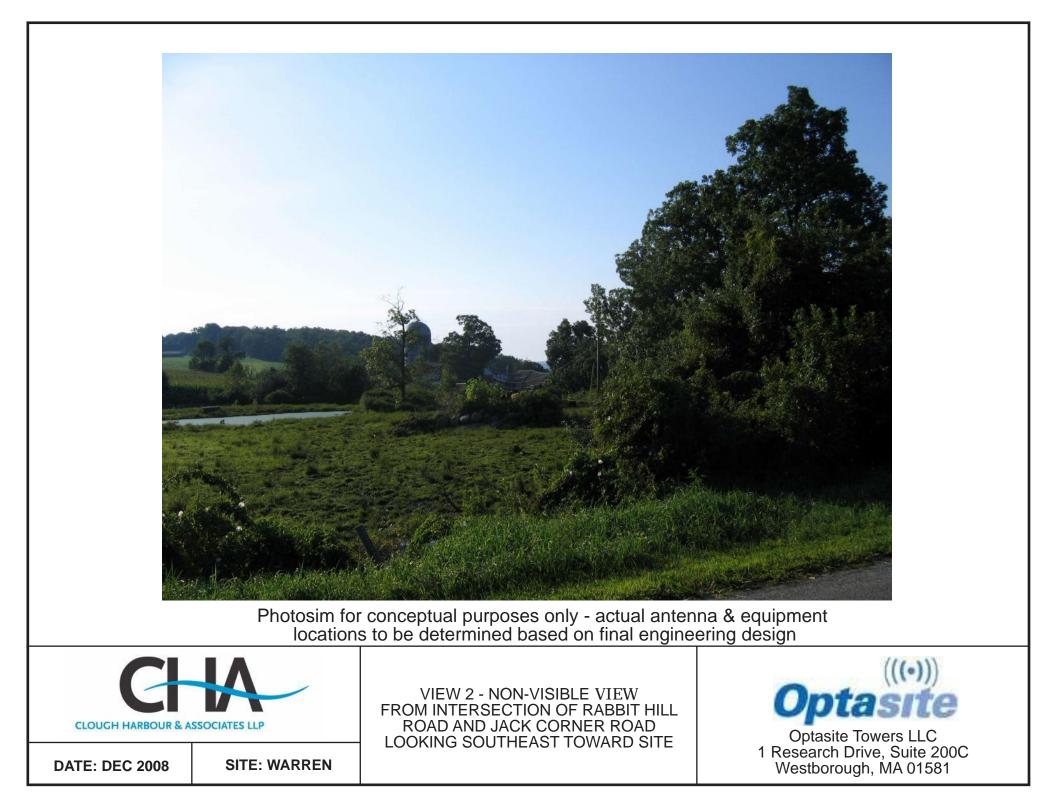
ATTACHMENT A: Site A Viewshed Map



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04		450 4.500	11 12	6,800 6,000	18	860 580	25 26	4,460 5,330		
05	_	4,500 3,600	12	3,600	20	500	20	12,230		
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OPTASITE TOWERS LLC     2139 Siles Deare Highway, Sule 212 - Rody Hill, CT 08087-2336     Main: (880) 287-4587 · www.cloughharbour.com     WieSTOPDOLICH, MA, 015 81										
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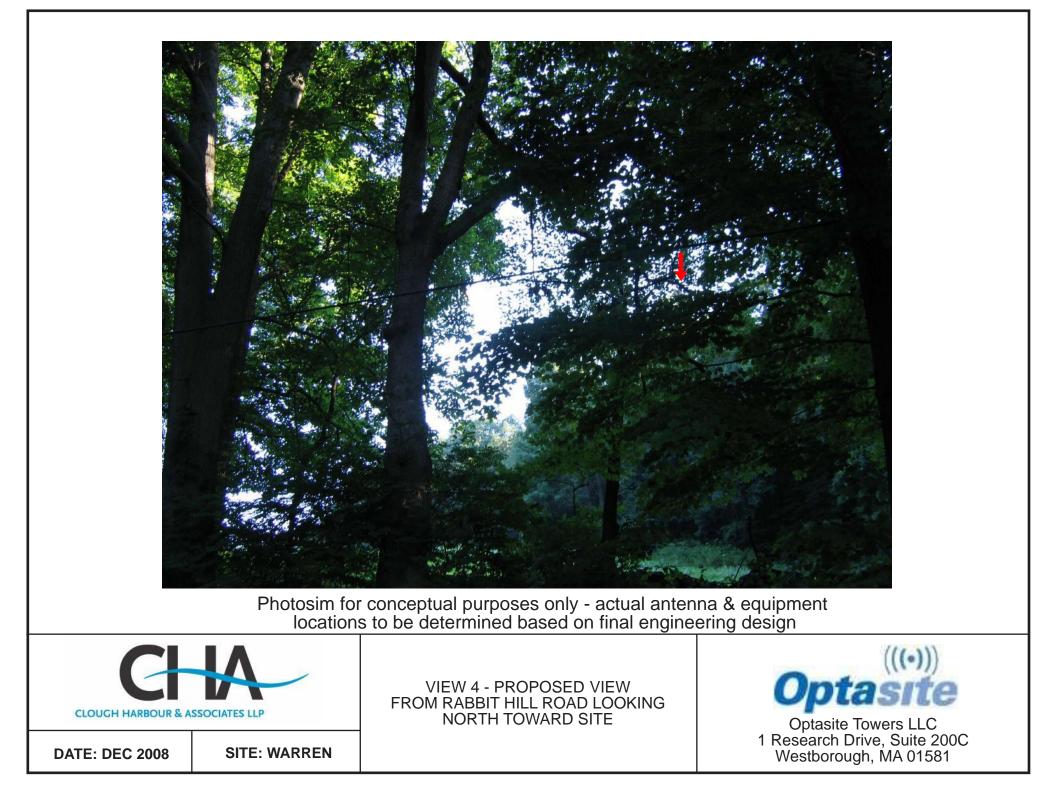
ATTACHMENT B: Site A Photosims

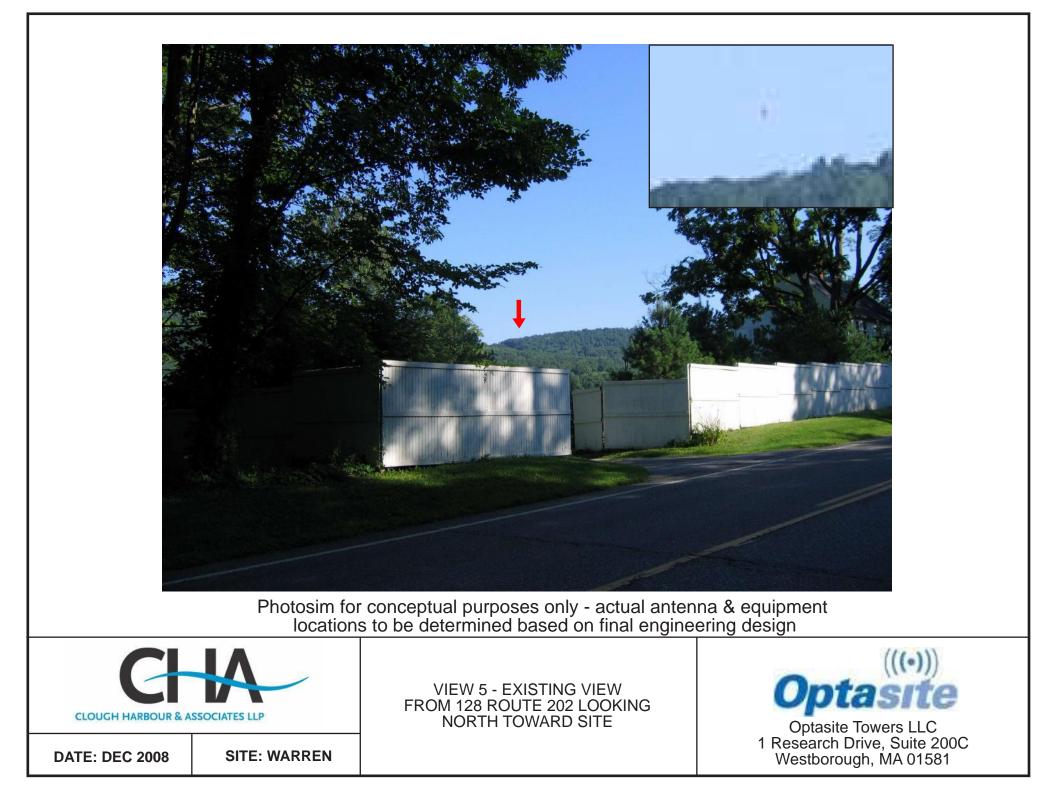




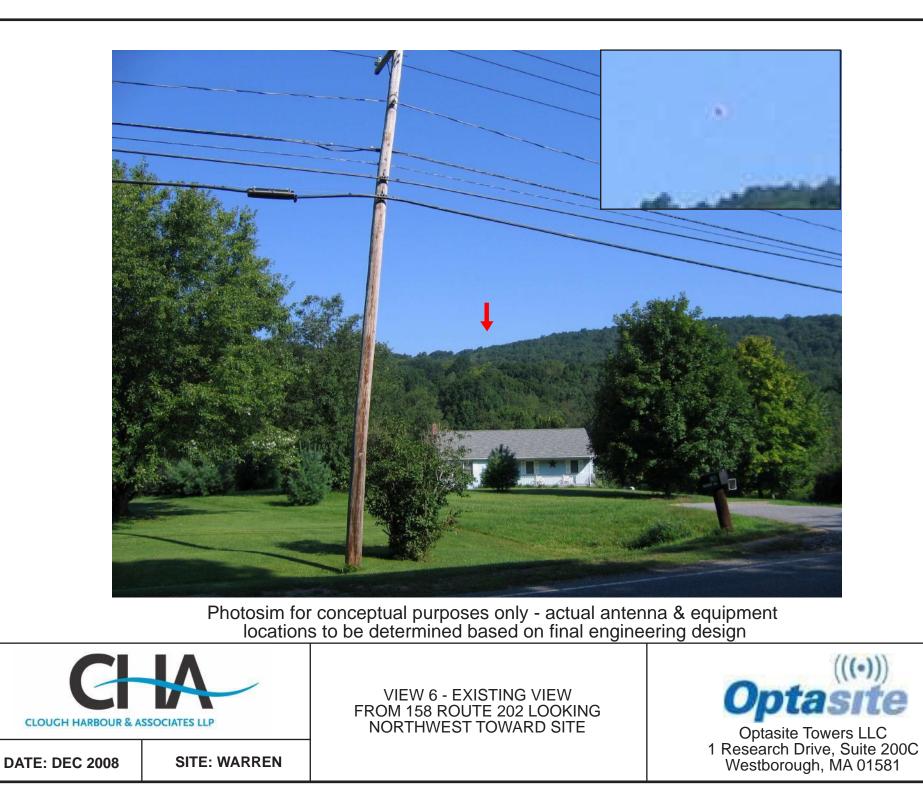


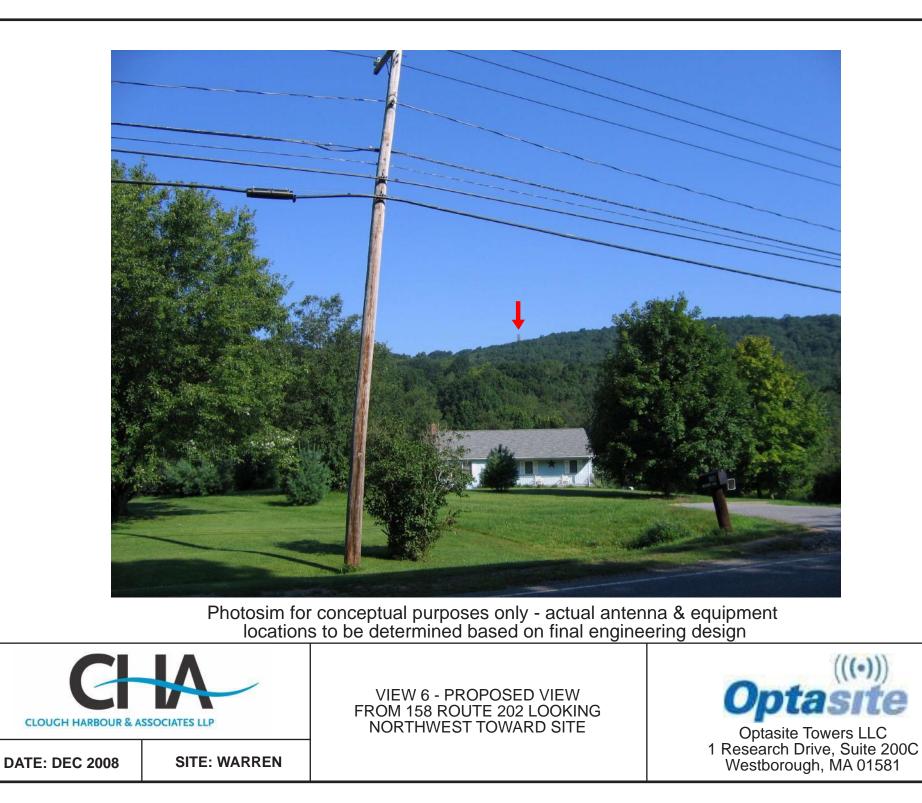


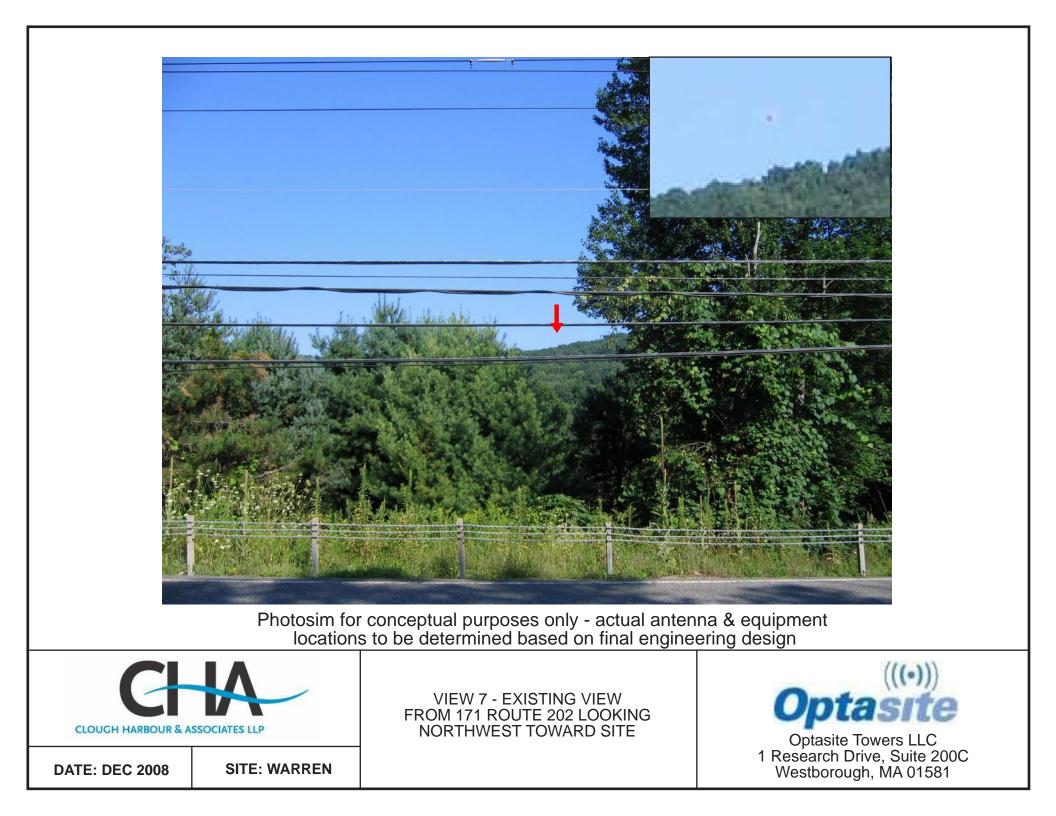


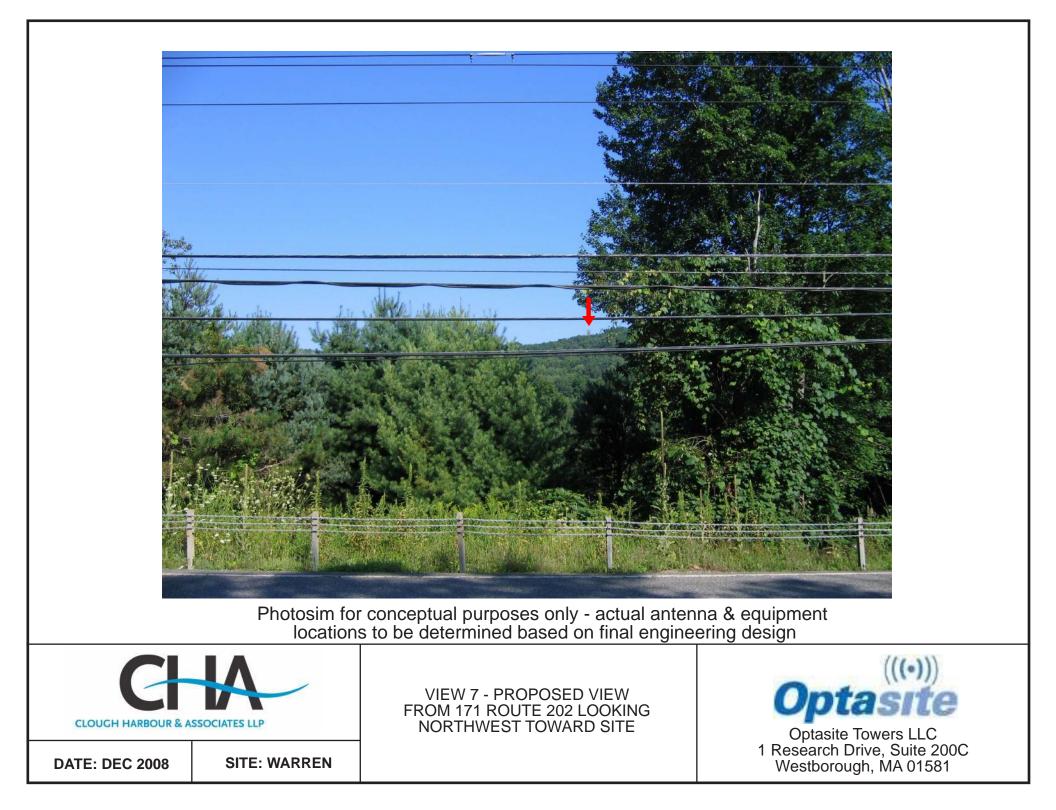
















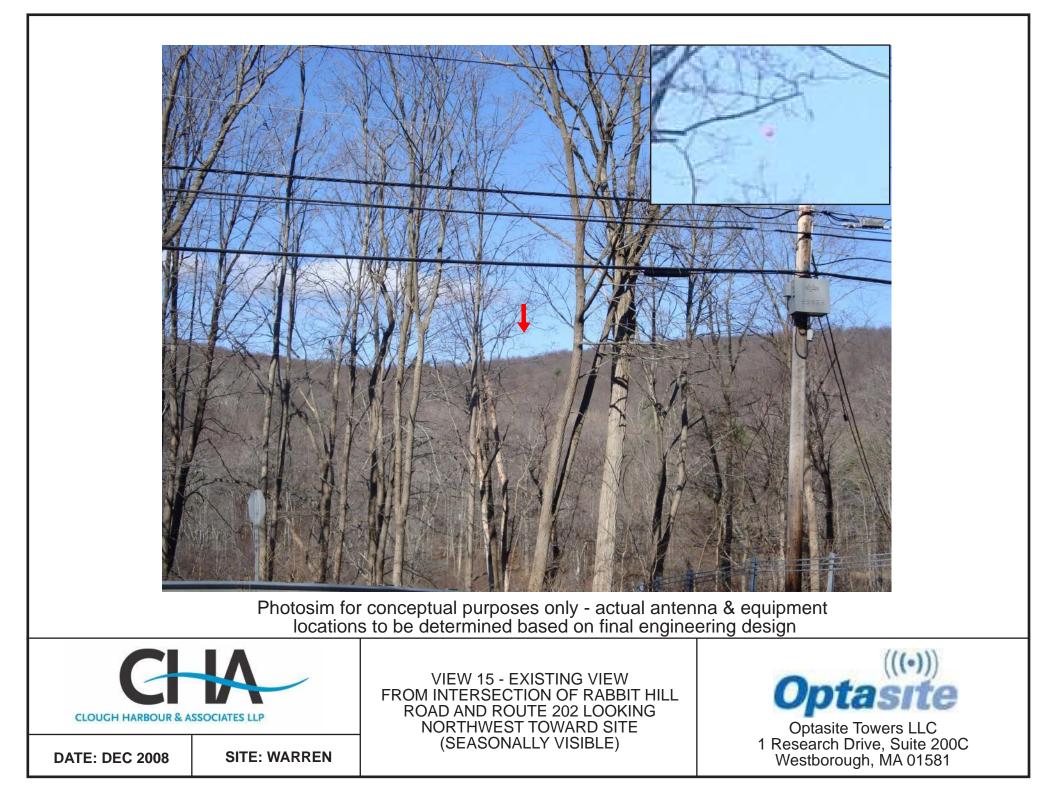


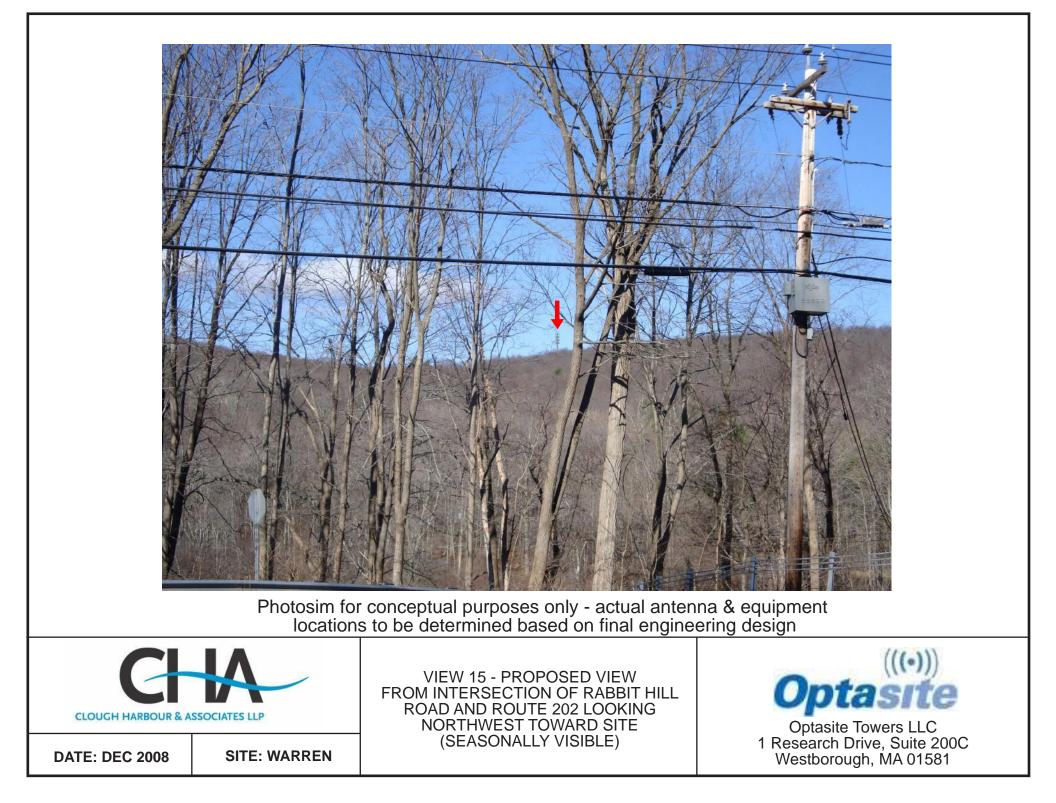






























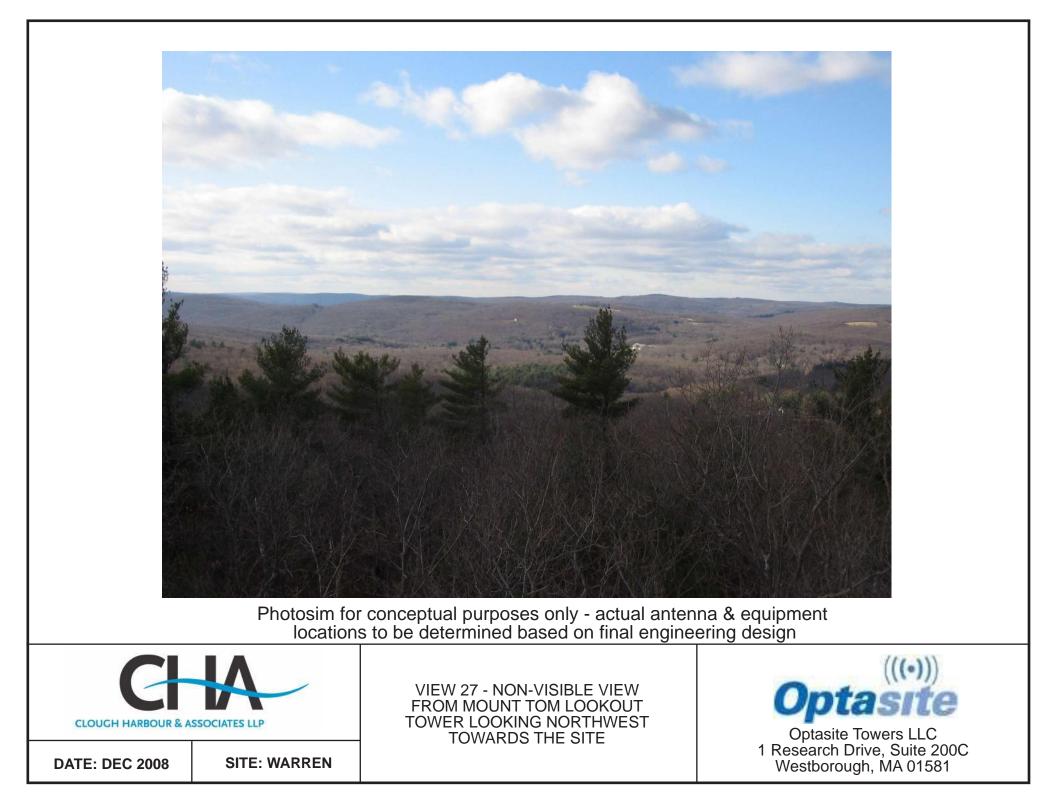




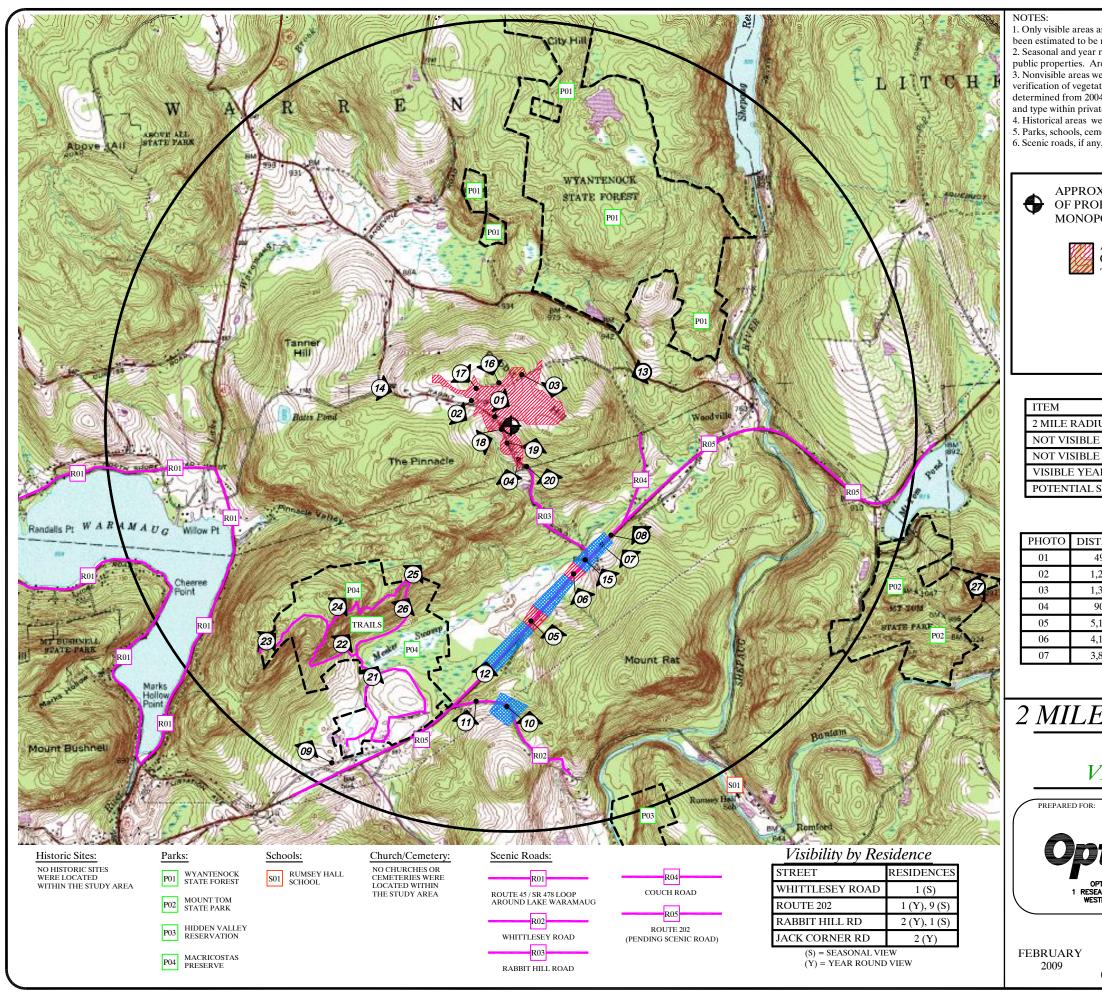








ATTACHMENT C: Site B Viewshed Map



are shown on the map utilizing the process described in note 2. The remainder of the map has nonvisible utilizing the process described in note 3. round areas of visibility were estimated from a field visual analysis within public R.O.W. and reas shown on private property were interpolated from the field visual analysis. ere estimated from a computer generated topography & vegetation analysis and field tion & building screening within public R.O.W and public properties. Vegetation limits were 4 aerial photos and is assumed to be 65' high. Verification of vegetation height, coverage, te areas not visible from public R.O.W or public properties was not field verified. ere determined from national and state historical registers. neteries, and churches were determined from street maps and field observations. <i>Legend</i> XIMATE LOCATION POSED 160' POLE APPROXIMATE LIMIT OF YEAR ROUND TOWER VISIBILITY C# CHURCH/CEMETERY (# CHURCH/CEMETERY) P# PARK							
H# HISTORICAL SITE S# SCHOOL TRAIL OR SCENIC ROAD							
Visibility by Acreage							
US AREA			APPROXIMATE ACRES			00%	
DUE TO TOPOGRAPHY			8,053			00% 8.3%	1
DUE TO TOPOGRAPHY			4,692 3,236			8.3% 0.1%	1
R ROUND			5,230 79		40.1%		
EASONAL VISIBILITY				46		).6%	1
Distances from Photo Locations to Tower         T. (FT)       PHOTO       DIST. (FT)       PHOTO       DIST. (FT)							
90	08	3,860	15	4,000	22	7,190	
230	09	9,940	16	1,170	23	8,490	
370	10	7,310	17	1,340	24	6,530	
00	11	7,230	18	270	25	4,630	
110	12	6,490	19	460	26	5,540	
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890	14	3,550	21	7,470			
E VIEWSHED ANALYSIS MAP							
WARREN 2 TSUAL IMPACT ASSESSMENT							
(((•))) <b>taste</b> towers LLC ARCH DRIVE, SUITE 200C TBOROUGH, MA 01581 PREPARED BY: Daving Copyright 0 209 <b>GHUA</b> 209 Siles Deare Highway, Suite 212 · Rody Hill, CT 00067-2336 Mair: (800) 257-457 · www.chacompanies.com							
0 625' 1250' 2500' 5000' FIGURE VS-01							

ATTACHMENT D: Site B Photosims







